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ABSTRACT

This study used a single-subject design to investigate the feasibility of using computer access technology by Braille reading students who are mainstreamed. The technology would reduce the time that vision teachers spend transcribing Braille work for mainstream teachers and thereby increase the time vision teachers spend in direct instruction and consultation. Three Braille students and their three vision teachers were the subjects of the study. Students used various software programs including speech access programs. During the intervention, the Braille reading students each used a computer and computer access technology to do their classwork and produce a print copy for their mainstream teacher. For all three teachers, there was a marked decrease in the amount of time spent transcribing the students' classwork from Braille to print when the student used computer access technology. There was also an increase in the amount of time the teachers spent in direct instruction, although there was not an increase in consultation time. Data collection forms are appended. (Contains 14 references.) (DB)

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The Effect of Computer Technology by Braille Students on Instruction Time

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The amount of time needed for paper work and limited amount of time remaining to meet other job responsibilities, such as direct instruction and consultation, are contributing to low morale among vision teachers (Bina, 1982; Knowlton, 1987). In a survey (Bina, 1982), vision teachers who graduated from non-visually impaired training programs reflected higher morale than did those from visually impaired training programs. An explanation Bina offers for this is the possibility that, once graduates from visually impaired programs are in the field, they become disillusioned with the realities they find there.

These realities with which vision teachers are currently confronted are the direct result of a serious situation in the field of education of the visually impaired. The provision of services to visually impaired students in the public schools is being greatly affected by the simultaneous increase in the number of visually impaired students and shortage of certified vision teachers. While estimates indicated a 19% increase between 1984 and 1990 in the number of visual impairments in children birth to five years of age, studies show closing and endangered teacher training programs producing fewer teachers trained to provide these children with appropriate educational services (Silberman, et. al, 1989; Uslan, 1983).

Vision teachers in the field are being affected by this situation in a number of ways. Teachers with large and increasing caseloads are finding it difficult to prioritize and perform all job responsibilities. Although vision teachers surveyed indicated that more time was spent in direct instruction than any other activity, direct instruction accounted for only 31-40% of their time. These teachers indicated that the second and third most time consuming responsibilities were pre- and post-assessment consultation, each constituting 21-30% of their time (Knowlton, 1987).

As a teacher's caseload increases, so does the amount of paper work and the amount of time needed to complete it. In Bina's 1982 survey, vision teachers ranking 10 dissatisfying job factors identified paper work as fourth, but only one point behind their second and third choices, which were tied. In other words, the teachers found paper work to be a very dissatisfying job factor. In an effort to help vision teachers be satisfied with their jobs, maintain high morale, and meet the needs of their

students, steps must be taken to deal with the reality of the existing problems. As Swallow (1990) indicates, our future goals might best be "to validate new approaches, training options, and learning materials" for vision teachers.

Purpose

Among paper work responsibilities of vision teachers is the task of transcribing the braille reading student's braille classwork into print to make it accessible for the mainstream teacher. The first purpose of this study was to show that the use of computer access technology by braille reading students who are mainstreamed would be one method of reducing the amount of time vision teachers spend at one aspect of paper work, the task of transcribing. The second purpose was to determine whether vision teachers would spend an increased amount of time in direct instruction and consultation if a decrease in amount of time spent on paper work were demonstrated.

A single-subject design was used for this study due to the limited number of available subjects in the low incidence population of vision teachers and braille reading students in the Charleston County School District. A multiple baseline design across subjects was rejected because of the unfeasability of achieving stability across three subjects in the baseline behavior of transcribing braille classwork to print. A reversal design was rejected because the aim of the study was to change behavior and not to return to baseline conditions. The researcher chose to use a baseline-intervention design, with a brief transition period between the two phases, applied simultaneously across three subjects involved in the same tasks. The three dependent variables were transcribing students' classwork from braille to print, providing direct instruction, and providing consultation. The independent variable was the students' use of computer access technology to do classwork. This design enabled the researcher to introduce and stop baseline, transition and intervention phases simultaneously across all three subjects and to simultaneously examine data across all three subjects.

The subjects used for this study were three vision teachers, chosen for the following reasons: each had a braille reading student on her caseload, each had experience teaching and using computer access technology, each had proficient braille transcribing skills, and it was anticipated that each would

express willingness to participate in the study. Teacher 1 was an itinerant teacher with a caseload of eight students in eight schools, one of whom was a braille reader mainstreamed for all of her 12th grade classes: Algebra III and Trigonometry, Advanced Placement (AP) Spanish IV, AP English IV, Ap Psychology 101, and Teacher Cadet. Teacher 2 was a resource/self-contained teacher with a caseload of nine students in one school, one of whom was a braille reader mainstreamed for four of his 10th grade classes: English II, American Government/Civics, and sociology. Teacher 3 was an itinerant teacher with a caseload of eight students in three schools, one of whom was a braille reader mainstreamed for all of his 8th grade classes: social studies, science, Algebra I, English, Spanish I, band, and SAIL (gifted and talented program).

Written consent was obtained from the parents of each of the three braille reading students whose classwork would be an integral part of the study. The researcher contacted each parent by phone, described the study, and explained the consent form which would be sent home for signature. Written consent was also obtained from each of the three subjects in the study with the option to withdraw from the study at any time. The researcher explained the specific procedures of the study to each of the subjects and discussed the consent form before obtaining signatures. Data collection did not begin until signed consents were received from subjects and parents. In addition, the researcher spoke with each of the three students involved to describe the study and answer any questions which might have arisen. Prior to conducting the study, permission was also obtained from the Mississippi State University Institutional Review Board and the Department of Evaluation and Research in Charleston County School District.

Instruments

The researcher provided each subject with eight data collection sheets, each resembling a calendar designated to cover a specific five-day work week (see Appendix A). The calendar box for each day indicated where start and stop times were to be recorded. Following a system of duration recording, each subject was asked to record daily the number of minutes she spent transcribing her braille reading student's classwork from braille to print. The start time was recorded the minute

transcribing began and the stop time recorded the minute transcribing ended. In addition, each subject was to record daily on the data collection sheet the number of minutes spent in direct instruction and the number of minutes spent in consultation.

The data collection sheets also provided a place for subjects to note factors which had a direct effect on the amount of time spent in transcribing, direct instruction, and consultation they did for the week. Anticipated factors included school vacations, illnesses, malfunctioning computer equipment, or lack of access to a computer. The researcher collected these data sheets on a weekly basis.

Materials

No computer hardware or software was purchased for this study. Subjects used equipment and materials which were recommended to them by the researcher and were already available to them and their students through the Vision Program or at the students' schools.

Student 1 was a braille reader with 20/400 best corrected near vision who used an Apple IIe with a Slotbuster speech card and Echo speaker, Talking AppleWorks word processor, and an ImageWriter II printer. This setup was available to her at all times in the school media center. She also had access to an Apple IIe or Macintosh Classic and an ImageWriter II in each of her classrooms and occasionally used these with no speech access.

Student 2 was a braille reader with no light perception who used an IBM PS2/30 with a SynPhonix 210 speech board and Soft Vert speech access program, a Proprinter, and PFS: Write word processor. He also used a Braille 'n Speak which he downloaded to the Proprinter with a serial-to-parallel converter cable. This setup was available to him at all times in the vision classroom.

Student 3 was a braille reader with light perception only who used an Apple IIe with a Slotbuster speech card and Echo speaker, Talking AppleWorks word processor, and an ImageWriter II printer. This setup was on a computer cart and was wheeled for his use among his classrooms and the school's computer lab.

Procedure

On the designated starting date, the subjects began recording the number of minutes they spent each day at the tasks of transcribing, direct instruction and consultation, and continued to do so until told by the researcher to stop. The researcher plotted this baseline data on multiple graphs, one for each subject (see Appendix B). During the period of baseline data collection, the braille reading students each used a brailler to do classwork for their mainstream teachers. Also during this time, the subjects addressed the computer access objectives on their braille reading students' IEPs by reviewing and teaching these skills.

Baseline procedures continued for a period of four weeks. At the end of four weeks, the subjects were told by the researcher to stop collecting data for a week's transition period. During the transition period, the subjects readied the hardware and software needed for intervention, reviewed the intervention procedures with their students, and explained intervention procedures to their students' mainstream teachers.

Intervention procedures began on the sixth week and lasted four weeks. During the period of intervention data collection, the braille reading students each used a computer and computer access technology to do their classwork and produce a print copy for their mainstream teachers. During intervention, the subjects recorded data and the researcher plotted this data on the multiple graphs (see Appendix B). At the completion of the intervention phase, each subjects' daily times were averaged for baseline and intervention phases and plotted on bar graphs. The researcher was available throughout baseline, transition and intervention phases to provide any technical assistance needed.

Across all three subjects, there was a marked decrease in the amount of time each spent transcribing the braille reading student's classwork from braille to print when the student used computer access technology (see Graph 1). The daily average amount of time Subject 1 spent transcribing was reduced from 8.75 minutes during baseline to 1.5 minutes during intervention. Of the three students, Student 1 had the most previous experience with computer use and was already using the computer to

a certain extent when this study was conducted. During the intervention phase, Student 1 did virtually all her classwork using a computer.

Subject 2 demonstrated the greatest decrease, with the daily average time spent transcribing reduced from 46 minutes during baseline to 10.95 minutes during intervention. Of the three students, Student 2 had the least amount of previous exposure to the computer and access devices and he responded extremely well to their use.

The daily average amount of time Subject 3 spent transcribing was reduced from 29 minutes during baseline to 10 minutes during intervention. Subject 3 reported that Student 3 did not always take the initiative to wheel the computer to class during the intervention phase and his mainstream teachers were not as cooperative as she would have liked. She felt he might have done more classwork on the computer had this not been the case.

Factors affecting the amount of time subjects spent transcribing during baseline phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(5) Vision teacher absent, illness
(3) Student chose to use computer rather than brailler for final exams
(2) Teacher workday, no students
(1) Holiday, no school
(1) Vision teacher absent, out-of-town conference
(1) Mainstream teacher absent

Factors affecting the amount of time subjects spent transcribing during intervention phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(3) Vision teacher absent, out-of-town conference
(2) Vision teacher absent, local conference
(1) Holiday, no school
(1) Vision teacher absent, illness

When the amount of time each spent at the task of transcribing braille to print decreased during intervention, there was an increase across all three subjects in the amount of time each spent in direct instruction (see Graph 2). Subject 1 showed an increase in average daily time in direct instruction from 109 minutes during baseline to 124.75 minutes during intervention.

Subject 2 showed an increase in daily average time spent in direct instruction from 240.7

minutes during baseline to 254 minutes during intervention. Subject 2 is a school based self-contained/resource teacher and is, therefore, involved in a greater amount of time spent in direct instruction than either Subject 1 or Subject 3, who are itinerant teachers. The daily average amount of time Subject 3 spent in direct instruction increased from 149.1 minutes during baseline to 195.25 minutes during intervention.

Factors affecting the amount of time subjects spent in direct instruction during baseline phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(7) Student on caseload absent
(5) Vision teacher absent, illness
(3) Vision teacher doing referral screening
(2) Teacher workday, no students
(1) Holiday, no school
(1) Placement meeting
(1) Multidisciplinary team meeting

Factors affecting the amount of time subjects spent in direct instruction during intervention phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(5) Testing
(3) Vision teacher absent, out-of-town conference
(2) Vision teacher absent, local conference
(2) Student on caseload absent
(1) Placement meeting
(1) Extended homeroom period
(1) Tornado drill
(1) Vision teacher absent, illness
(1) School assembly
(1) Vision teacher transcribing during direct instruction time
(1) Vision teacher providing inservice

The hypothesized functional relationship between a decrease in the amount of time spent transcribing and time spent in consultation was not observed in any one of the three subjects. None of the three demonstrated an increase in the amount of time spent in consultation when the amount of time spent at transcribing decreased (see Graph 3). In fact, there was a decrease in the amount of time spent in consultation across all three subjects during the intervention phase. Subject 1 showed a decrease in the daily average amount of time spent in consultation from 19.2 minutes during baseline to

18.75 minutes during intervention.

Subject 2 showed a decrease in the daily average amount of time spent in consultation from 39.6 minutes during baseline to 28.25 minutes during intervention. Subject 3 showed a decrease in the daily average amount of time spent in consultation from 16.5 minutes during baseline to .5 minutes during intervention. Subject 3 reported inconsistent recording of data regarding consultation during the intervention phase.

Factors affecting the amount of time subjects spent in consultation during baseline phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(5) Vision teacher absent, illness
(2) Teacher workday, no students
(1) Vision teacher absent, out-of-town conference
(1) Holiday, no school
(1) Mainstream teacher absent

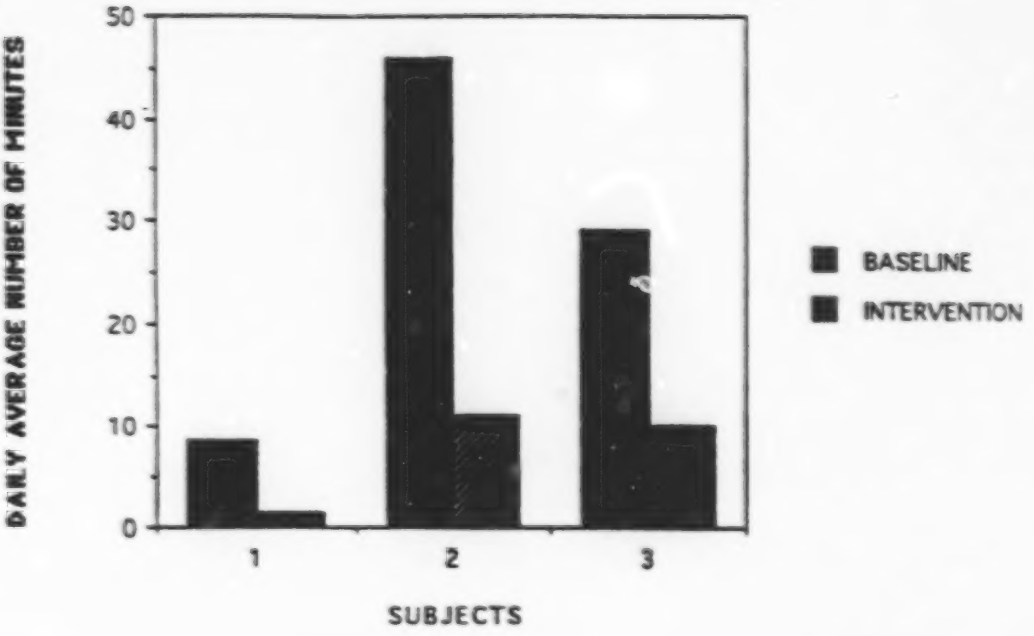
Factors affecting the amount of time subjects spent in consultation during intervention phase were reported by the subjects as follows, with frequency of incidence noted in parentheses:

(3) Vision teacher absent, out-of-town conference
(2) Vision teacher absent, local conference
(1) Holiday, no school
(1) Vision teacher absent, illness

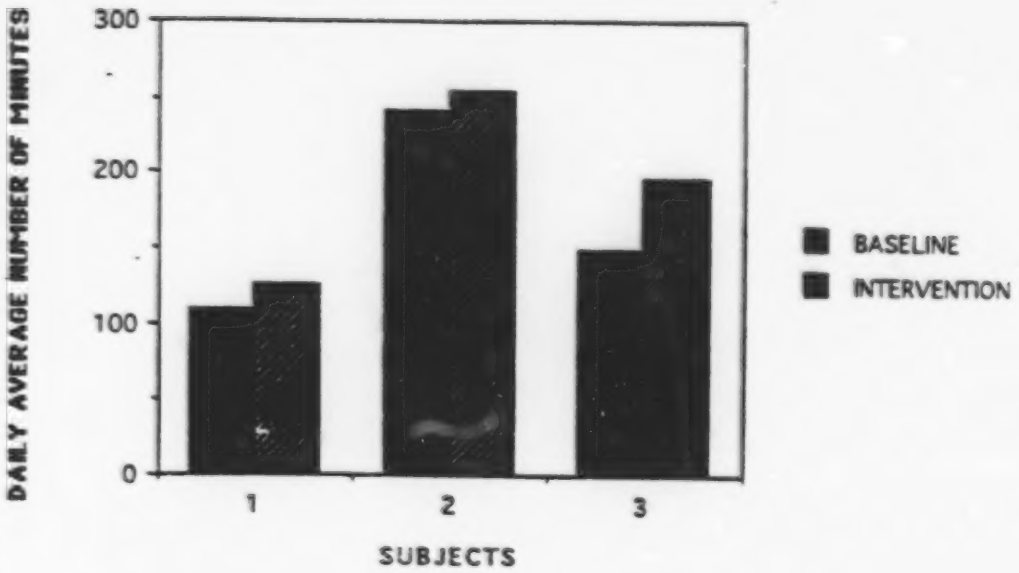
Consultation services provided by the subjects were reported to involve the following individuals: parent(s), eye doctor, school nurse, regular education teacher, special education teacher, multidisciplinary team (at meetings), principal, guidance counselor, and job coach.

Summary

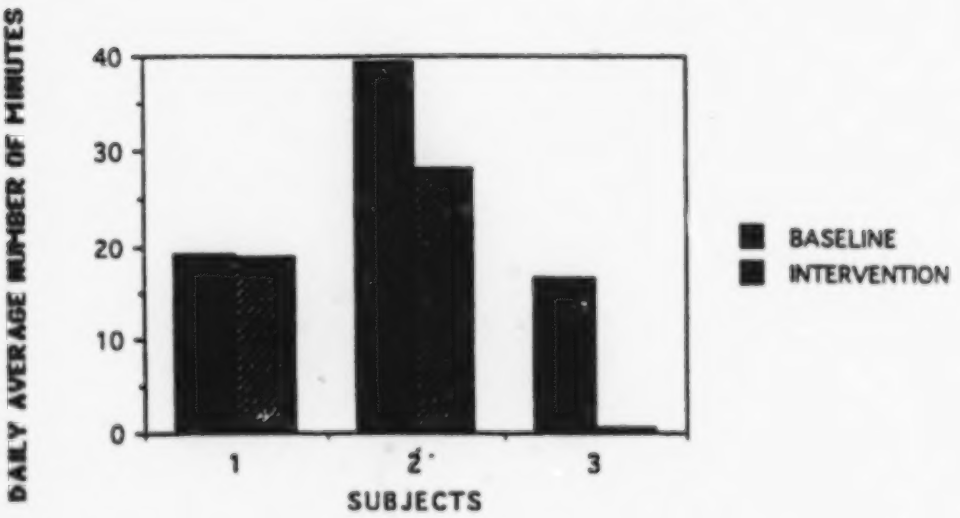
The use of computer access technology by braille reading students to do their classwork was clearly demonstrated in this study to create a decrease in the amount of time three vision teachers spent at the task of transcribing braille to print. The study also demonstrated that the amount of time three vision teachers used for direct instruction was increased when they were able to spend less time at the task of transcribing. A reduction in the amount of time the teachers spent transcribing did not, however, appear to provide them with an increase in the amount of time they used for consultation.



Graph 1. Amount of time spent transcribing braille to print during baseline and intervention phases.



Graph 2. Amount of time spent in direct instruction during baseline and intervention phases.



Graph 3. Amount of time spent in consultation during baseline and intervention phases.

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Appendix A

WORK WEEK OF: _____ TEACHER #

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Time Spent Transcribing Braille to Print	Start: Stop: Start: Stop: Start: Stop:	Start: Stop: Start: Stop: Start: Stop:	Start: Stop: Start: Stop: Start: Stop:	Start: Stop: Start: Stop: Start: Stop:	Start: Stop: Start: Stop: Start: Stop:
Time Spent in Direct Instruction	____ mins. ____ mins. ____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins. ____ mins. ____ mins.
Time Spent in Consultation	____ mins. ____ mins. ____ mins. ____ mins	____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins.	____ mins. ____ mins. ____ mins. ____ mins.
NOTE ANY FACTORS WHICH HAD A DIRECT EFFECT ON AMOUNT OF TIME SPENT EACH DAY (e.g., school vacations, illness, computer malfunctioning, etc.)					
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY

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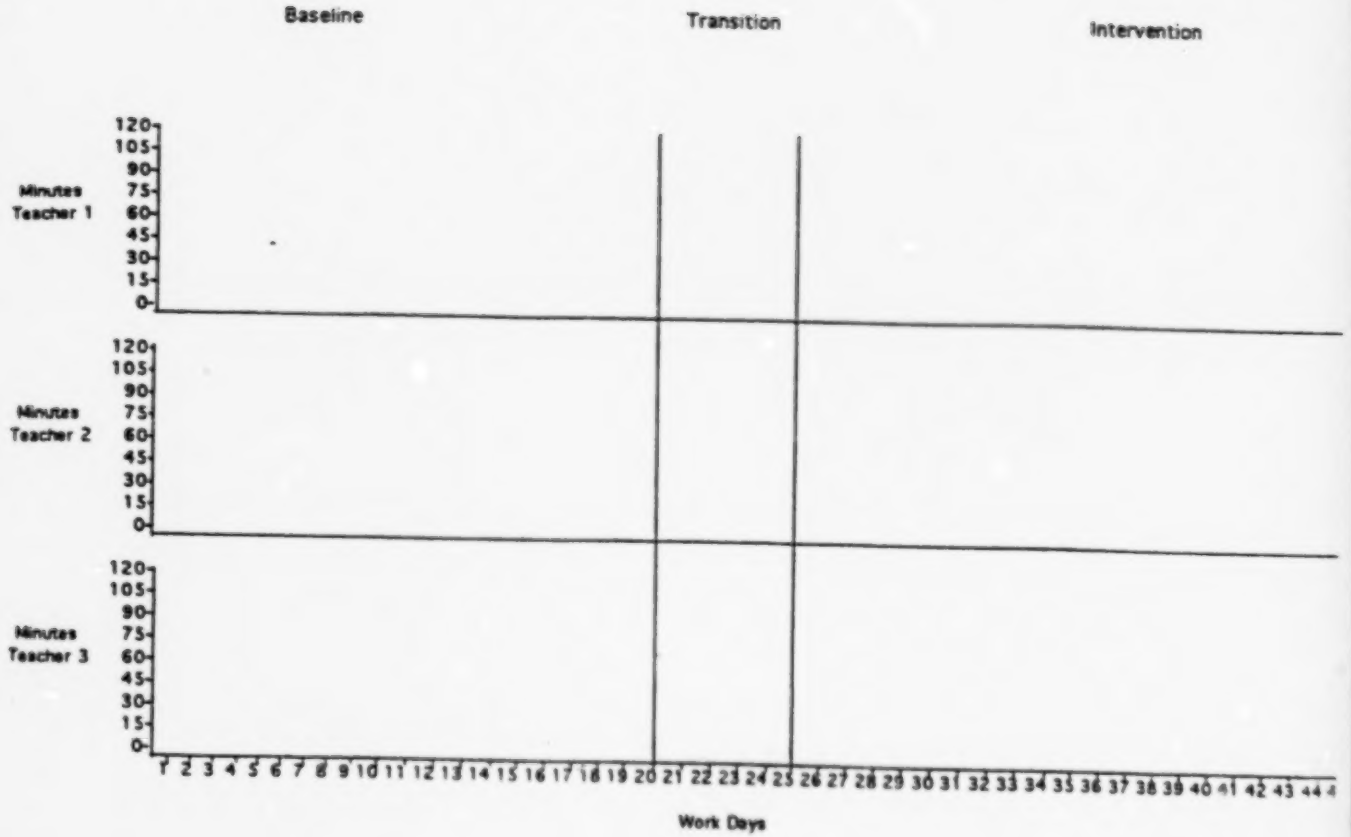

MINUTES PER DAY SPENT TRANSCRIBING BRAILLE TO PRINT

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